

## SELF-ALIGNED SOURCES FOR TRENCH DMOS TRANSISTORS

### ABSTRACT OF THE DISCLOSURE

A trench field-effect transistor with a self-aligned source. At least a  
5 portion of the source implantation dose (604) is implanted underneath the gate (610) of a  
trench transistor by implanting an a non-orthogonal angle to the sidewall (608) of the  
trench. In one embodiment, a slow diffuser, such as arsenic, is implanted to minimize the  
post-implant diffusion. The resulting structure ensures gate-source overlap, and a  
consistent, small, gate-source capacitance with a lower thermal budget for the resultant  
10 device. The narrow depth of the source, in conjunction with its unique L-shape,  
improves device ruggedness because the source doping does not compensate the heavy  
body doping as much as with conventional devices. In one embodiment, the substrate is  
rotated 180 degrees within the implanter to implant both sidewalls of a trench.

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